

Original Research Article

Long-term results of tonsillectomy in professional opera singers: a pilot study

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Received: 20 December 2019

Revised: 25 March 2020

Accepted: 27 March 2020

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ABSTRACT

Background: The primary goal of this study was to evaluate the long-term influence of tonsillectomy on the quality of life and voice performance of opera singers. Survey study which was reviewing the long-term effects of tonsillectomy.

Methods: Retrospective review of patients' records and surveys in which patients have answered the questions about the influence of tonsillectomy on their voice. A total group of 30 singers was included in the study. They answered the questions about the indications for surgery, symptoms, and changes in their voice after surgery. The study group consisted of 19 women and 11 men. Mean age was 18.53 years old at the moment of surgery. The group included eleven sopranos, six mezzos, two contraltos, four tenors, five baritones, and one bass singer.

Results: A most common indication for tonsillectomy in opera singers was recurrent tonsillitis and was present in over 83% of cases. After surgery, the voice performance was better in 60% of cases, breathing improved in 50% of cases, voice emission was higher in 53% of cases. Over 80% of singers would recommend that surgery to another opera singer.

Conclusions: Singers evaluated long-term influence of tonsillectomy as positive. Over 80% admitted improved effect on emission and the function of voice.

Keywords: Opera singers, Tonsillectomy, Long-term result, Singing

INTRODUCTION

Palatine tonsils are a cluster of active lymphoid tissue and are located in the vocal tract, between palatoglossal and palatopharyngeal arches.¹ Hence, palatine tonsils can decrease oropharyngeal space and may move forward the tongue. Their interaction within vocal tract might influence the articulation of consonants. Hypertrophic tonsils may cause nasal speech, oral breathing, or muffled voice.² During the production of certain sounds, the soft palate moves, touches the back of the throat, and seals off the nasal cavity above from the oral cavity below.

Enlarged tonsils may disturb that movement and prevent the soft palate from touching the back of the throat, interfering with velopharyngeal closure. For this reason, air escapes from the nasal cavity and causes hyper nasal speech.³ These aspects are one of many ways in which the palatine tonsils may interfere in the vocal tract.

Tonsillectomy is one of the most frequent procedures performed in paediatric patients as well as in adults. Indications for surgery are recurrent acute and chronic tonsillitis, hypertrophic tonsils which cause sleep apnoea and snoring, and elevated Anti-streptolysin antibodies.

Less frequent causes but more severe consist Streptococcal endocarditis, rheumatoid arthritis, glomerulonephritis and others. The most common complications of surgical procedure are pain, early and late bleeding, dehydration, and wound infections. Complications rate around 20% was reported in adults in literature.¹

Voice is mainly produced by a pair of vocal folds located in the larynx. Formant characteristics of voice are mainly created by the shape of vocal tract.⁴ Oral cavity, soft and hard palate, paranasal sinuses are resonant structures that help with enhancement of the vocal signal. Modifications of the shape of vocal tract are presumed to cause differences in speech characteristics of an individual.

The question of concern is always whether changes after surgery will remain minimal or cause a significant impact on the voice of a singer.

Palatine tonsils participate in the resonance of the oral cavity with massive effects. Moreover, tonsils may take part in nasal resonance. Changes in voice quality and speech are characteristic for oedema and swelling during tonsillitis or peritonsillar abscess. Due to that tonsillectomy and surgical intervention may alter the voice characteristics. Another relevant aspect of surgery in this location is sometimes significant widening of vocal tract after removal of tonsils, and risk of scarring in the oral cavity.

A special group of patients are professional voice users among whom the elite are opera singers. Possible aspects of modifications in their voices influence the decision about the surgery and sometimes prolong the conservative treatment causing a higher complication rate.

So far, only a few studies have addressed the influence of tonsillectomy on voice performance in adults. Those studies compared pre- and postoperative voice parameters in the general population. Our study is original because of the fact that we decided to summarise our experience in performing tonsillectomy in a special group of professional opera singers. Claros clinic has been a referral centre for professional opera singers since 1970 gathering experience in management and treatment of unique voice pathologies.

METHODS

The research started with a retrospective review of professional opera singers' medical records operated between years: 2013-2018 at Claros clinic. The group of singers who underwent tonsillectomy for various reasons was collected. A total of 30 patients who had tonsillectomy because of chronic tonsillitis or recurrent acute tonsillitis were included in the study. Next, the survey including 17 questions was prepared (Annexure) and sent to chosen patients via email at the beginning of

February 2018. Questionnaires were filled and sent back in a two weeks period. Majority of patients remained under close supervision in Claros clinic till the present moment and responded at once.

All 30 patients underwent cold knife tonsillectomy under general anaesthesia and were operated by the same, most experienced senior ENT surgeon. Sutures for palatine arches were not implemented in any of those cases. Surgical bed after tonsil removal was left for healing. Any late bleeding was not reported in these cases. Patients were asked to keep a special diet for 10 days. They were receiving prescribed antibiotic for the first seven days (oral penicillin), and oral anti-inflammatory pain relief medications.

The study protocol was approved by the internal ethics committee in Claros clinic. All personal patients' information was hidden from a researcher who was evaluating the questionnaires.

The group included 30 professional opera singers, 11 men, and 19 women. Mean patients' age at the moment of surgery was 19.3 years old. Classical voice representants were: 11 sopranos, six mezzo-sopranos, two contraltos, four tenors, five baritones, and one bass singer.

Patients who were at least one year after surgery received questionnaires. The group of singers who had shorter follow-up were excluded from the study.

The survey was divided into three parts. The first part was composed of general questions about patient's characteristics, indications for surgery, and prevalence of pharyngitis after the surgery, first-line treatment, and the second-part included questions about voice performance after the surgery and the third part questions about the aspects of quality of life.

Usually, the patients had three answers to choose while evaluating specific symptoms: better/improvement, the same, and worse. A detailed questionnaire is presented in (Annexure).

Collected data were analysed, the most common symptoms reported by patients were recognized. The questionnaire was subjected to analysis. The most common answers were identified and discussed.

Due to the qualitative nature of the data obtained from medical history more complicated analyses were not possible.

Ethical approval

All procedures performed in the studies involving human participants were in accordance with the ethical standards of our clinic.

Informed consent

Informed consent was obtained from all individual participants included in the study.

RESULTS

The data was collected in an excel sheet and analysed. Classical voices representation within the group was presented in (Table 1). Specific parameters like mean value or incidence of symptoms and indication for surgery were calculated and presented in (Table 2).

Table 1: Characteristics of singers.

Variables	Number of singers	
Soprano	11	Mean age: 18.53 years old
Mezzo-soprano	6	
Contraltos	2	
Tenor	5	
Baritone	5	
Bass	1	
Total	30	

Table 1 presents the characteristic of the study group and classical voice representation (tessitura).

Indications for surgery were gathered and the incidence was estimated. Specific parameters like mean value or incidence were calculated and presented in (Table 2).

Table 2: Q4 indications for surgery pointed out by patients (multiple choices).

Indication for surgery	Number of patients	Percentage (%)
Recurrent tonsillitis	25	83
Halitosis (bad breath)	2	6
Enlarged tonsils which caused snoring or sleep apnea	6	20
Rheumatoid arthritis	3	10
Endocarditis	2	6
Psoriasis	1	3
Glomerulonephritis	4	12
Elevated ASO levels (anti-streptolysin O)	22	73
Iritis	1	3
Recurrent peritonsillar abscess	3	10

Table 2, presents the most important indications for tonsillectomy with a number and percentage of patients who have undergone the procedure for that particular reason.

Most common indication for surgery was recurrent tonsillitis present in 83% of patients, and elevated levels

of ASO present in 73% of cases. Severe complications like endocarditis and recurrent peritonsillar abscess were infrequent.

Answers to particular questions from the questionnaire are summarised in detail below.

Part 1

Among singers who have answered questionnaires: 93% percentages of them noticed a reduction in the incidence of pharyngitis (Q5), also 97% admitted that the frequency of antibiotic treatment related to throat infection decreased (Q6). Pharyngitis infection caused by group A streptococcus (GAS) was tested with (STREP A - test) in 70% of cases, 23% of patients were not sure, and 6% said that they had not been tested with STREP A test (Q7).

Part 2

In second part patients have answered the questions about comfort during the voice performance. Hence, 80% of patients admitted that they feel better after surgery, 17% said that they feel the same and 3% admitted to feeling worse (Q8). Regarding voice function: 60% of patients answered: better, 36% answered: same, only 3% said: worse (Q9). Better resonance was noticed by 63% of patients, and 36% did not see the difference (Q10).

Over 76% of patients have not experienced any discomfort after surgery, 20% of singers admitted to feeling uncomfortable for some period of time (Q11). Among those listed, the longest time of reporting these symptoms was around 6 months (mean time was 8 weeks). Moreover, 20% of patients answered that they had to take pain relief medications for some period (Q12).

Part 3

Regarding ‘fiato’ which means a natural ability of the singer to produce an adequate dosage of air during singing, 90% of singers have not noticed any difference in that aspect of performance (Q13).

Moreover, 40% of patients noticed that their voice range was modified, 56% of them did not see the difference (Q14). Breathing function was improved in 50% of singers (Q15). Also, voice emission was better in 53% of cases (Q16).

To one of the most important question: would you recommend this surgery for another opera singer, 80% of respondents said: yes, 16% said maybe, and 3% did not answer (Q17).

DISCUSSION

Opera singers are considered to be elite among professional voice users. Their expectations are very

high, putting much pressure on surgeon before a decision about treatment. Literature regarding surgery on a vocal tract of professional voice users is sparse. Due to that fact, the decision-making process is based on personal experience of the surgeon.

The most important aspect concerns proper evidence-based qualification to surgery which meets patient's expectations. These considerations have resulted in our design of that particular study.

In general, professional opera singers from our study group have judged the long-term results of tonsillectomy as satisfying. The influence of probable distortion of the vocal track was not a significant concern. In the study, presented by Apaydin et al, three months after the procedure voice performance parameters like F0, jitter and shimmer were comparable to those before the surgery.⁴

In short time follow up, perceptual changes of voice were found statistically significant in many reports. However, after three months of observation, all parameters used to return to preoperative level.⁵ Moreover, Subramaniam and Kumar studied the group of patients aged between 5 and 26 years who had a tonsillectomy and compared preoperative acoustic voice analysis data (F0, jitter, and shimmer) with the data obtained 1 month after surgery. No significant alterations in F0 and jitter postoperatively in patients older than 17 years of age were found; however, shimmer decreased significantly.⁷

Further, in a study conducted by Mora on adults with enlarged tonsils but with normal voice resonance he reported improvement with various voice parameters e.g., F0, Jitter, NHR. The level of different voice parameters was similar to the healthy control group. Meaning that general voice quality improved after the procedure.⁸

Due to this finding, a safe recommendation for the patient would be approximately three months of partial restriction from the high-level performance. In our group, prolonged discomfort which could interfere with voice performance was present in only 1/5 of the patients and usually lasted for less than a month.

Hypertrophic tonsils in the oropharynx that reach upward into the nasopharynx cause velopharyngeal insufficiency, impeding full palatal movement. A large mass of tonsillar tissue may obstruct sound transmission into both oral and nasal cavity causing a mixture of hyponasality and "cul-de-sac" resonance.³ Tonsillectomy resulted in the elimination of these symptoms. Resonance was evaluated as normal after the procedure. In our group, 63% of patients observed better resonance after the procedure. The postoperative normalization of hypernasality draws attention to the absence of nasal air escape during speech and highlights the important role of enlarged tonsil in velopharyngeal closure. For all these reasons, a pre- and post-operative objective speech

analysis in all patients with tonsillar hypertrophy should be performed.

Interesting aspect mentioned in several studies was an improvement in consonant articulation after tonsillectomy.⁶ Similarly, the improvement in voice emission and function was noticed by a considerable amount of our respondents.

Tonsillectomy, even in case of unique patients like opera singers, was evaluated as a safe and reliable procedure when being performed by trained hands.

The proper recommendations still need further studies because of the lack of-research in larger group of patients and mainly due to the fact that group of professional voice users expands.

We are aware of the preliminary character of this research. We are planning the prospective study in which influence of tonsillectomy on opera singers' voice will include pre- and postoperative voice assessment. For future studies, the effects of different tonsillectomy techniques are worth investigation.

CONCLUSION

Singers evaluated long-term influence of tonsillectomy as positive. Over 80% admitted improved effect on the emission and function of voice.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Clarós P, Sobolewska A, Pujol MC, Clarós-Pujol A, Clarós A. Long-term results of tonsillectomy in professional opera singers: a pilot study. *Int J Otorhinolaryngol Head Neck Surg* 2020;6:815-20.

ANNEXURE

Questionnaire: Tonsillectomy - post-operative review

The survey was created to evaluate the outcome of tonsillectomy (palatine tonsils removal surgery). Please answer the questions below.

Part 1

- Q1:** What is your gender?
(A) Female, (B) Male
- Q2:** What was your age at the moment of surgery?
Your answer...
- Q3:** What is your voice type (tessitura)?
(A) Soprano, (B) Mezzo-soprano, (C) Contra-alto, (D) Tenor, (E) Baritone, (F) Bass
- Q4:** What were the indications for the surgery? (multiple choice question)
(A) Recurrent tonsillitis, (B) Halitosis (bad breath), (C) Enlarged tonsils which caused snoring or sleep apnea, (D) Rheumatoid arthritis (tonsillectomy was recommended by a dermatologist), (E) Endocarditis (cardiologist recommended tonsillectomy), (F) Psoriasis (tonsillectomy was recommended by a dermatologist), (G) Glomerulonephritis (tonsillectomy was recommended by nephrologist), (H) Elevated ASO levels (anti-streptolysin O), (I) Iritis (recurrent inflammation of iris; tonsillectomy was recommended by an ophthalmologist), (J) Recurrent peritonsillar abscess
- Q5:** Has the incidence of pharyngitis-decreased since the surgery?
(A) Yes, (B) No
- Q6:** Has the frequency of antibiotic therapy related to throat infection decreased after the surgery?
(A) Yes, (B) No
- Q7:** Have you ever been tested for pharyngitis infection caused by group A streptococcus (GAS) (STREP A - test)?
(A) Yes, (B) No, (C) I don't know

Part 2

- Q8:** How do you feel after the surgery?
(A) Better, (B) Same, (C) Worse
- Q9:** How is your voice functioning?
(A) Better, (B) Same, (C) Worse
- Q10:** Do you feel the voice's resonance cavities have changed?
(A) Improved, (B) Same, (C) Worse
- Q11:** Have you experienced any discomfort in the pharynx after the surgery?
(A) Yes, (B) No
- Q12:** Have you been taking any new medication?
(A) Yes, (B) No new medications

Part 3

- Q13:** Do you think your fiato (the natural ability of the singer to produce an adequate dosage of air during singing) has been modified?
(A) Yes, (B) No
- Q14:** Do you think your vocal range has modified?
(A) Yes, (B) No
- Q15:** Has the breathing improved?
(A) Yes, (B) No
- Q16:** Have your voice emission improved?
(A) Yes, (B) No
- Q17:** Would you recommend this surgery to another opera singer?
(A) Yes, (B) No, (C) Maybe

Please comment if you feel I should know anything regarding your surgery?